

REMARKS

Claims 1-8, 10-13, 16-24, 26-41 are currently pending in the subject application, and are presently under consideration. Claims 1-8, 10-14, 16-24, 26-41 have been rejected. Claim 14 has been cancelled. Favorable reconsideration of the application is requested in view of the amendments and comments herein.

I. Rejection of Claims 1-8, 10-14, 16-24, 26-41 under 35 U.S.C. 103(a)

Claims 1-8, 10-14, 16-24, 26-41 stand rejected under 35 U.S.C. §103(a) as being unpatentable over US Pat. No. 6,711,662 to Peir et al. (hereinafter, "Peir et al.") in view of US Pat. Pub. 2002/0133674 to Martin et al. (hereinafter, "Martin et al."). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Regarding claim 1, the Office Action contends that "in predicting the next requestor, the system is predicting the next owner since the next owner is simply the processor to possess the most recently updated copy of the data." Office Action, page 2, lines 6-7, citing Peir et al. col. 2, lines 1-4. Applicant submits that this statement is not supported by Peir et al. and appears illogical or otherwise misunderstands what is being discussed in Peir et al. Whether the prediction of a next requestor as taught by Peir et al. may, in certain circumstances, result in identifying a next owner is not dispositive regarding the patentability of claim 1.

Significantly, claim 1 also recites that a given owner predictor associated with a processor includes two components for predicting an owner node. The Office Action contends that both of the components recited in claim 1 are taught by Peir et al. In particular, the Office Action alleges that "prediction based on ownership history of the data block" corresponds to the claimed first component that predicts an owner node of the block of data by observing the pattern of instructions within the processor. However, in contrast to claim 1, Peir et al. does not teach or suggest that any prediction based on the ownership history of a given data block is made by observing the pattern of instructions in "the processor." It must be recalled that the given owner predictor is associated with such processor. Thus, the first component of the owner predictor of claim 1 predicts an owner node for the block of data by observing the pattern of instruction within its associated processor. In contrast, the ownership history, as taught by Peir et al. relates

to ownership of the data block and is not associated with a pattern of instructions with a particular processor.

Additionally, in claim 1, the same owner predictor (which is associated with “the processor”) also includes a second component that stores ownership update messages provided from the owner predictor control. In sharp contrast, the prediction table disclosed in Peir et al. is stored in the home directory or in the prediction facility 22 of the memory 16. Peir et al. specifically teaches that the prediction facility 22 is the structure that informs the predicted next requestor about the current owner of the data block by sending the current owner information to the predicted next requestor. Peir et al., Col. 3, lines 40-49. Therefore, since the prediction table is used by the prediction facility 22 **to send** the current owner information to a predicted next requestor, such **prediction table does not store** any type of ownership update message provided from owner predictor control, as recited in claim 1.

From the foregoing it is demonstrate that, in claim 1, the determination of ownership is distributed between the owner predictor control and the given owner predictor. Specifically, the owner predictor control predicts ownership and provides the ownership update message to at least one owner predictor. Additionally, the given owner predictor predicts an owner node based on instructions within the processor as well as stores the ownership update message. Such combination prediction mechanisms (*e.g.*, pattern-based prediction of the first component and the ownership state based prediction of the second component), as recited in claim 1, is absent from Peir et al. and Martin et al., taken individually or in combination.

It still seems unclear why the Office Action seeks to add the teachings of Martin et al. when Peir et al. specifically teaches that the prediction facility 22 of Peir et al. already performs many if not all of the functions that the Office Action mentions are taught by Martin et al. Significantly, the predictor 98 is described in Martin et al. as being used to predict which processors are likely to have copies of the block 19 being sought. Nevertheless, even if the teachings of Martin et al. are combined with Peir et al., the combined teachings still fail to teach or suggest an owner predictor having the two components recited in claim 1.

For the reasons discussed above, Applicant respectfully requests reconsideration and allowance of claim 1 as well as claims 2-8, 10-12 and 39 and 40 that depend from claim 1.

Regarding claim 11, the Office Action states that “the history is being used to prioritize the update message since the next owner or requestor identified is identified based on history.” Office Action at page 3. However, the cited section of Peir et al. (Col. 3, lines 3-25) specifically relates to the prediction facility 22, which is the part of the Peir et al. system that makes a prediction for the current owner information, which is sent to the predicted requestor (Col. 3, lines 40-47. In sharp contrast, in claim 11 (which depends from claim 1) the second component of the owner predictor actually stores the ownership update messages and, as recited in claim 11, such component prioritizes the update messages based on a determination by the first component of the owner predictor. Since such a first component is absent from the teachings of Peir et al. (see above), there consequently is no teaching in Peir et al. about such interrelationship between such first and second components of the owner predictor to prioritize the update messages that received from the owner predictor control. This difference relates to a fundamental difference between the system of claim 1 and the approach taken in Peir et al.

Regarding claim 12, it again seems necessary to point out that the owner predictor includes two components (see claim 1) and in claim 12 a particular use of the first and second components is recited; namely, the processor employs the given owner predictor to determine a predicted owner and the given owner predictor further selects between accessing the first component and the second component according to the frequency that update messages have been received from the owner predictor control. In contrast, Peir et al. fails to teach or suggest any selection between components because no such first and second components are mentioned in Peir et al. Instead, Peir et al. teaches that the processor checks the current owner table for a needed data block and then sends an inquiry to the home directory and to the current owner from the current owner table. Peir et al. Col. 3, lines 55-67. There simply is no teaching of any selection of between first and second components in Peir et al., especially not according to the frequency in which the owner predictor receives ownership update messages from the owner predictor control. Such a selection simply is not suggested from the combined teachings of Peir et al. and Martin et al.

The Office Action (at page 4, lines 3-7) alleges that Peir et al. teaches “the next requestor can be extended to include a small set of processor” corresponds to the plurality of processors comprising the multi-processor network of claim 13. In marked contrast, a primary object in

Peir et al. relates to use of a prediction facility 22 to provide current owner information to a predicted next requestor. Peir et al. Col. 2, lines 60-67. Even the explicit mention of the scenario when a data block can be accessed by a single writer and multiple readers, Peir is clear that the next requestor can be extended a small set, which would not be based on Peir et al. extend to each of the processors. See Peir et al., Col. 3, lines 33-39. For instance, if Peir et al. would operate to send the current owner information to each of the processors in the network, then there would be no purpose or need for the prediction facility 22 to determine who will be a next requestor in the system 10. That is, regardless of the size of the multi-processor network, if the prediction facility provided the current owner information to each of the processors as is being suggested in the Office Action, then there would be no reason to predict which processor will be the next requestor.

In sharp contrast to claim 13, Peir et al. specifically employs an approach where this particular prediction is made to identify the next requestor and send the current owner information to the predicted next requestor - whether it be one processor or a small set of processors. As a result, the suggested interpretation of the teachings of Peir et al. would make the system of Peir et al. inoperative for its intended purpose as there would no longer be a need to determine the next requestor. One of ordinary skill in the art would not consider this interpretation to be within the teachings of Peir et al. absent the use of **improper hindsight** in which the present application is being used as blueprint to modify the teachings of Peir et al. Since the prediction facility 22 of Peir et al. is disclosed as a part necessary for operation of the system 10 so that a predicted requestor or a small set of requestors can receive the current owner information, there is no teaching or suggestion in Peir et al. to broadcast an update to respective owner predictors for each of the plurality of processors, as recited in amended claim 13. Reconsideration and allowance of claim 13 are respectfully requested along with claims 16-20 that depend from claim 13 (claim 14 has been cancelled).

Claim 21 is patentable for similar reasons to those discussed with respect to claim 13. However, claim 21 uses slightly different language by reciting that an owner predictor is associated with each of a plurality of processor nodes that form the system and an update control provides an ownership update message to the owner predictor associated with each of the plurality of processor nodes. That is, the processor nodes are recited as forming the system and

the ownership update message is provided to the owner predictor associated with each of the plurality of processor nodes.

Regarding claim 27, the Office Action state seems to misunderstand the relationship between requests and messages that are recited. In claim 27, the requestor sends two requests, the first request to the home node and a second request to the predicted owner (from claim 21). In the cited section of Peir et al. at Col. 4, line 51, through Col. 5 line 6, it is significant that Peir only sends an inquiry to the home directory (**not** a request) and the that the home directory will not respond to the inquiry if the predicted current owner is the current owner. Peir et al. makes clear that a request is different from an inquiry - the inquiry is to confirm whether the current owner is correct. Peir et al. Col. 4, lines 3-5. Peir et al. explicitly teaches that the home directory will not respond to this inquiry regardless of whether the predicted current owner is the actual owner (see blocks 39 and 43 of FIG. 3B which are the only two results). Moreover, the section of Peir et al. at Col. 5, lines 1-6, relates specifically to a situation when the requesting processor P does not find the current owner in its current owner table. Claim 26 from which claim 27 depends recites that the predicted node comprises the owner node, such that the description at Col. 5 lines 1-6 is not relevant (since it relates to when Processor P does not find a current owner). Significantly, in Col. 5 lines 1-6 of Peir et al. no parallel request and inquiry are sent out to the home directory, but instead only a single request for the data is sent to the home node, which sends a request to the owner, which results in the owner returning the data X to the processor P and to the home directory. However, in no scenario described in Peir et al. is there any victim message provided to the home node, which results in a corresponding speculation acknowledgement being provided to the requesting processor P, consistent with what is recited in claim 27.

Claim 28 is patentable for similar reasons to claim 27, in that the owner node provides a victim message to the home node has been amended to correct a typographical error by reciting that the owner node provides the data response to the requesting node in response to the second request from the requesting node. The Office Action relies on the same section of Peir et al. as was used to reject claim 27, namely the description relative to FIG. 3B and in particular Col. 5 lines 1-6. As discussed above with respect to claim 27, however, this section of Peir et al. (at Col. 5, lines 1-6), relates specifically to a situation when the requesting processor P does not find

the current owner in the current owner table, whereas claim 28 by virtue of its dependency on claim 26 recites that the predicted node comprises the owner node. Moreover, a victim message as recited in claim 28 does not correspond to a data response which the current owner returns to processor P and to the home directory 20 in Peir et al. (Col. 5 lines 5-6).

Claim 30 should be allowed for substantially the same reasons as discussed above with respect to claim 13 and 21. It should be recalled that claim 30 recites “ means for broadcasting updates **to all the means for identifying** in response to a change in ownership of the block of data, the means for updating being remote from the means for identifying (emphasis added).” The Examiner agrees that the next requestor in Peir et al. may not be ALL the processors. Office Action, at page 4, lines 4-5. Moreover, despite the different claim language between claims 21 and 30, the Office Action simply relies on the same rationale used to reject claim 21 as its sole basis for rejecting claim 30. Due the differences between claims 30 and 21 and due to the Examiner’s own admission, claim 30 and its dependent claims 31-33 are patentable. Allowance of these claims is requested.

Claim 34 for is patentable for similar reasons to those discussed with respect to claims 13 and 30 since the update ownership state information is updated at each of a plurality of owner predictors associated with processors that form a multi-processor system.

Regarding claims 39 and 41, the Office Action does not appear to have considered what is expressly recited in these claims. The Office Action states that Peir et al. predicts the next requestor based on history each time a processor claims new ownership and, therefore, prediction is done according to frequency. Office Action, at bridging paragraph between pages 4-5. However, each of claims 39 and 41 does not recite that prediction is performed according to a frequency at which a new processor claims ownership (as stated in the Office Action). Instead, each of these claims 39 and 41, the owner predictor control is configured to discontinue broadcasting the update message based on one or more of (i) an available bandwidth in the system, or (ii) a frequency with which the given block of data changes ownership. In view of the substantial differences between claims 39 and 41 and the teachings of Peir et al., the Office Action has failed to present any evidence sufficient to support the legal conclusion that claims 39 and 41 are obvious.

II. CONCLUSION

In view of the foregoing remarks, Applicant respectfully submits that the present application is in condition for allowance, including claims 1-8, 10-13, 16-24, and 26-41. Applicant respectfully requests reconsideration of this application and that the application be passed to issue.

Should the Examiner have any questions concerning this paper, the Examiner is invited and encouraged to contact Applicant's undersigned attorney at (216) 621-2234, Ext. 106.

No additional fees should be due for this response. In the event any fees are due in connection with the filing of this document, the Commissioner is authorized to charge those fees to Deposit Account No. 08-2025.

I hereby certify that this correspondence is being transmitted to the U.S. Patent and Trademark Office via electronic filing on August 4, 2008.

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